Order No. G. 4995, dated Bangalore, 7th April 1904.

Ordered that the following Note by the Superintendent, Government Gardens, on the introduction, spread, and possible utility of Manihot Glaziovii— the Ceara Rubber tree— in the Mysore State, be published among official papers in the *Mysore Gazette*.

By Order,

K. S. CHANDRASEKHARA AIYAR,
for *Offg. Secy. to Govt., Gen. & Rev. Depts.*

NOTE ON THE INTRODUCTION, SPREAD, AND POSSIBLE UTILITY OF MANIHOT GLAZIOVII, IN THE MYSORE STATE.

Introduction and Distribution.

The Ceara Rubber tree— Manihot Glaziovii— is indigenous to Brazil, and takes its commercial name from the the town of Ceara in that country. As regards the work of the Lal-Bagh, our first plants were obtained from the Royal Botanic Gardens at Calcutta in 1879. The actual number has not been recorded, but they were not many. In 1885 it was reported to Government that the species had thriven, and that the original trees had borne a second crop of seed from which about 1,000 seedlings had been raised. The first local distribution of seedlings took place in the following year. In 1887, 17 lbs. of seed were gathered from trees growing in the Gardens. From then till now trees have largely increased by planting and self production, so that within the limits of the City and Station alone, it would not be difficult to collect 500 lbs. of seed, 850 to 900 seeds going to a pound.

During the whole of the seed-bearing period, extending over 18 years, occasional distributions of plants and seeds have been made to planters, District officials, and such persons as wished to cultivate the tree.

Owing to this important agency, combined with that of private enterprise in the planting districts, the Ceara Rubber tree is now tolerably common in many parts of the Province.

Cultivation.

From the commencement the Ceara Rubber tree took kindly to the climate of Mysore. At first the seeds took a long time to germinate owing to the hard and resistant nature of the outer integument. But a remedy was soon found to this in slightly filing the dormant end of the seed, so as to expose the vital tissues to the action of warmth and moisture. Treated in this way seeds germinated freely within a month. Self-sown seeds, when well placed, usually germinate towards the end of the first monsoon. But when the conditions are unfavorable the seed will often lie *in situ* for years. The best results of self-sowing are nearly always found in grass land, especially when the grass is pretty thick.

In the moist coffee districts the tree grows rapidly and attains a large size in 4—6 years, it also remains longer in leaf than it does on the plains.

Maidan growth is more stunted, and the deciduous season often extends from January till June. But in whatever locality or situation, the best growth is always made in good land. It is, however, an eminently hardy tree that will attain a fair size even in the poorest land where useful trees are not usually found. It also establishes itself between the crevices of rocks and in places where one sees sandal, tamarind, and even the babul struggling for existence.

If once established in scrub tracts where the natural growth is fairly good it would spread rapidly and attain large growth. Of all the trees recently introduced it is the easiest to cultivate.

In forming regular plantations during the months of July and August when the ground has cooled down and the rainfall is usually favorable, seedlings of 8 to 12 months growth should be planted in rows at 12 feet apart each way. At this rate of planting every second sapling would have to be removed in the 5th year of growth. But the mutual shelter afforded during these first years of development would be the means of hastening growth generally, so that the plantation should be more advanced than if the seedlings had been originally put out at 24 feet apart. The actual time of thinning would really be regulated by the nature of the land and the condition of the seasons. At the time of thinning, or about the 5th year of growth, many of the saplings will begin to shed seed, and subsequently seedlings begin to spring up on all sides.

Another method of planting in the scrub tracts would be to form nursery plots, or small plantations, at intervals of half a mile or so each way, and leave nature to do the filling in. Cattle will not touch the seedlings.

Experiments in tapping.

In 1885, when our first saplings were only 5 years old, a considerable ball of rubber was collected for deposit in the Museum. But at that time the flow of latex was very feeble. Subsequent tappings, made chiefly in the planting districts, were also unsatisfactory, and led

to the general belief that, as a source of rubber, the tree would prove unproductive in this country. It was not therefore until 1900 that a sustained effort was commenced in the Lal-Bagh, to ascertain what the actual production of latex would amount to in trees of different ages, under slightly varying conditions of growth. Though crude in their way, these tapping experiments, which have been pursued for over three years under the personal supervision of the Curator, who is always on the spot, have amply proved that the Ceara tree is productive of latex, and hence rubber, in the dry climate of Bangalore.

It has also been proved, which is equally important, that the rubber is of good quality, the London Brokers of an Indian firm having estimated its value at 3 shillings per pound. Added to this the remarkable discovery has been made that a single tree will yield 7 lbs. of rubber during the year without being in the slightest exhausted. The tree thus operated upon is 15 or 16 years old. It was tapped 83 times during the year and gave the above outturn of solid rubber. To hear that a tree is worth a guinea a year is certainly most encouraging, and if the average result in working a large plantation amounted to half or even the quarter of that amount it would still be a good industry.

Without going into fuller detail, our tapping experiments have been the means of pretty clearly establishing the following conclusions :—

1. That at 15 years of age and upwards every woody part (including the root-limbs) is well charged with latex.
2. That trees are not equally productive of latex though all conditions appear to be the same. At the present stage of the experiment there are good and bad trees.
3. That the root-limbs are productive of latex when the trunk is nearly exhausted, and *vice versa*.
4. That the latex flows most freely from 6 to 8 A. M.
5. That excepting in wet weather, trees may be safely tapped at short intervals all the year round. Once a week would give a good average return of rubber.
6. That crude methods of tapping are wasteful, and require to be replaced by an improved method having proper tools and implements.

As regards improved methods of tapping we have had but little actual experience. But this paper would be incomplete without some advice in the matter.

When a healthy tree has attained 15 years of age it may be tapped. Such trees are usually of considerable girth, having a trunk nearly 4 feet in circumference at the base with a clean growth of 7 to 12 feet to the primary limbs or branches. The whole trunk may be tapped at intervals, though it is found inconvenient to operate much above a man's height from the ground. The best season for tapping the trunk is from July to January while the trees are in leaf. When trees are about to be tapped the outer dead bark should be removed, leaving the surface of the liber inner bark) as smooth and clean as possible. At this stage sponging or washing with lime juice or salt water has been recommended. In any case the latex should flow over a perfectly clean surface until it is deposited in equally clean receptacles placed around the base of the trunk, or suspended to the latter at points where the streamlets of milky juice can readily be intercepted. A very small quantity of clean water placed in each receptacle prevents coagulation, so that each day's collection of latex can be placed in a churn for the proper extraction of pure rubber.

The laticiferous vessels of this tree are situated in the liber or inner bark, which is usually of a greenish colour when first exposed to the light. It is a comparatively thin layer and the slightest puncture with a pin suffices to draw latex. Tapping the bark deeply, or slashing and scoring it obliquely to swell a central stream, fails to produce the best flow of latex while it undoubtedly injures the tree.

But when punctured and scored to the depth of $\frac{1}{6}$ of an inch, in the early morning, the flow is usually well sustained for a couple of hours.

There is still much to be learned about tapping the tree and preparing good marketable rubber. But it is hoped that this preliminary note may be of use to those who are interested in the cultivation of *Manihot Glaziovii*.

J. CAMERON, *Supt., Govt. Gardens.*